COMPLETE LISTING OF THE CLAIMS

The following lists all of the claims that are or were in the above-identified patent application. The status identifiers respectively provided in parentheses following the claim numbers indicate the current statuses of the claims.

1. (Currently Amended) ~~In an~~ An optoelectronic timing system~~, an optical compensation system for advancing or retarding an optical pulse within a pre-defined pathway, the system~~ comprising:

at least one semiconductor laser configured to issue subnanosecond optical pulses defining a periodic pulse train;

an optical timing system through which the pulses propagate, wherein the optoelectronic timing system asserts an electronic signal according to propagation of the optical pulses through the optical timing system;

a first optical waveguide coupled to the optical timing system, the first waveguide being configured to define a first time-quantifiable optical path for a pulse of the train;

a second optical waveguide coupled to the optical timing system, the second waveguide being configured to define a second time-quantifiable optical path for a pulse of the train different from the first waveguide~~ and coupled to the first waveguide through an optical switch~~; and

~~wherein, the length of the second time-quantifiable optical path has a defined numerical relationship to the length of the first time-quantifiable optical path, such that a pulse traversing the second path has a travel time lengthened by a specific quantity with respect to the same pulse traversing the first path~~

an optical switching system coupled to direct pulses from the semiconductor laser through the first optical waveguide or the second optical waveguide depending on timing of the pulses relative to prior pulses returned from the optical timing system.

2. (Currently Amended) The system according to claim 1, further comprising:

a third optical waveguide coupled to the optical timing system and to the optical switching system, the third waveguide being configured to define a third time-quantifiable optical path for a pulse of the train different from the first and second waveguide, wherein~~ and coupled to the first waveguide through a second optical switch; and~~

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~~wherein, the length of~~ lengths of the first, second, and third time-quantifiable optical ~~path has a defined~~ paths have numerical ~~relationship to the length of the first and second time-quantifiable optical paths~~ relationships, such that a pulse traversing the first path defines a nominal travel time, a pulse traversing the second path ~~having~~ has a travel time lengthened by a specific quantity with respect to the same pulse traversing the first path, and a pulse traversing the third path ~~having~~ has a travel time shortened by a specific quantity with respect to the same pulse traversing the first path.

3. (Canceled)
4. (Canceled)

5. (Currently Amended) The system according to ~~claim 4~~ claim 2, ~~the multiplicity of additional optical waveguides~~ further comprising a previous pulse path and a subsequent pulse path ~~the previous and subsequent pulse paths~~ that are operationally coupled to the ~~first and second~~ optical ~~switches~~ switching system, ~~the~~ arrival times of a previous and a subsequent pulse defining operation of the optical ~~switches~~ switching system such that the subsequent pulse is directed through the first, second or third time-quantifiable optical path.

6. (Currently Amended) The system according to ~~claim 5~~ claim 2, wherein the semiconductor laser develops pulses at a rate defining a time spaced-apart fundamental frequency of the optoelectronic timing system.

7. (Currently Amended) The system according to claim 6, wherein the system is configured ~~in a feed-back loop in which~~ to compare an actual arrival time of a subsequent pulse ~~is compared~~ to an expected arrival time of the pulse and the pulse travel time is either advanced, retarded or maintained at a nominal condition by being directed through the first, second or third time-quantifiable optical path, so as to maintain a pre-defined time spaced-apart periodicity relationship between each pulse.

8. (Canceled)

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9. (Currently Amended) In an optoelectronic timing system, an optical compensation method for advancing or retarding an optical pulse within a pre-defined pathway, the method comprising:

configuring at least one semiconductor laser to issue subnanosecond optical pulses defining a periodic pulse train;

configuring a first optical waveguide to define a first time-quantifiable optical path for a pulse of the train;

configuring a second optical waveguide to define a second time-quantifiable optical path for a pulse of the train different from the first waveguide, ~~coupling the first waveguide to the second waveguide through an optical switch; and~~ wherein [[,]] the length of the second time-quantifiable optical path has a defined numerical relationship to the length of the first time-quantifiable optical path, such that a pulse traversing the second path has a travel time lengthened by a specific quantity with respect to the same pulse traversing the first path; and

operating an optical switching system to direct pulses from the semiconductor laser through the first optical waveguide or the second optical waveguide depending on timing of the pulses relative to prior pulses returned from the optoelectronic timing system.

10. (Currently Amended) The method according to claim 9, further comprising:

configuring a third optical waveguide to define a third time-quantifiable optical path for a pulse of the train different from the first and second waveguide, wherein: ~~and coupled to the first waveguide through a second optical switch~~

operating the optical switching system directs each pulse from the semiconductor laser through the first, second, or third optical waveguide depending on timing of the pulse relative to return of a prior pulse through the optical timing system; and

wherein the length of the third time-quantifiable optical path has a defined numerical relationship to the length of the first and second time-quantifiable optical paths, such that a pulse traversing the first path defines a nominal travel time, a pulse traversing the second path having a travel time lengthened by a specific quantity with respect to the same pulse traversing the first path, and a pulse traversing the third path having a travel time shortened by a specific quantity with respect to the same pulse traversing the first path.

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11. (Canceled)

12. (Canceled)

13. (Currently Amended) The method according to ~~claim 12~~ claim 10,~~ the multiplicity of additional optical waveguides~~ further comprising:

receiving a prior pulse on a previous pulse path to the switching system; and

receiving a new pulse from the semiconductor laser on a subsequent pulse path to the switching system~~; the previous and subsequent pulse paths operationally coupled to the first and second optical switches, the~~ wherein operating the switching system is such that arrival times of ~~a previous and a~~ the previous and subsequent pulses ~~defining operation of the optical switches such that~~ determine whether the subsequent pulse is directed through the first, second or third time-quantifiable optical path.

14. (Currently Amended) The method according to ~~claim 13~~ claim 9, wherein the semiconductor laser develops pulses at a rate defining a time spaced-apart fundamental frequency of the system.

15. (Currently Amended) The system according to claim 14, wherein the system is configured ~~in a feed-back loop in which~~ to compare an actual arrival time of a subsequent pulse ~~is compared~~ to an expected arrival time of the pulse and the pulse travel time is either advanced, retarded or maintained at a nominal condition by being directed through the first, second or third time-quantifiable optical path, so as to maintain a pre-defined time spaced-apart periodicity relationship between each pulse.

16. (Canceled)

17. (Currently Amended) An optoelectronic timing system comprising:

at least one semiconductor laser configured to output a train of optical pulses at a rate defining a ~~particular~~ first frequency;

a first optical waveguide ~~having a first fundamental length, the waveguide~~ that is subdivided into ~~physical length~~ a plurality of segments, ~~each segment having a length equal to the other segments,~~ each ~~length segment~~ of the segments and the ~~fundamental length~~ first waveguide defining ~~a time-quantifiable~~ an optical path for ~~a pulse of~~ the train of pulses; ~~based upon the time required for a pulse to travel a particular length segment at the speed of light;~~

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a pulse detector coupled ~~at a terminal portion of each length segment~~ to respective terminal portions of the segments so as to issue a signal upon detection of a pulse traversing ~~the length segment~~ each of the segments; and

wherein [[,]] the~~ periodicity of~~ pulses received at the pulse detector and the signal from the pulse detector have a second frequency that is a multiple of the ~~particular laser output~~ first frequency, the multiple ~~based solely on the fundamental length and~~ depending on the number of ~~length~~ segments of the first optical waveguide.

[19] 18. (Currently Amended) The system according to claim 17, further comprising:

~~a multiplicity of~~ one or more additional optical waveguides, ~~each having a respective fundamental length,~~ each additional waveguide being further subdivided into ~~physical length~~ a plurality of segments, each segment having a length equal to the other segments of the additional waveguide, each ~~length~~ segment and respective ~~fundamental length~~ additional waveguide defining a time-quantifiable optical path ~~for a pulse of the train~~ based upon the time required for a pulse to travel ~~a particular length~~ the segment or additional waveguide at the speed of light;

~~a pulse detector~~ one or more additional pulse detectors respectively coupled to the one or more additional waveguides, each additional pulse detector being coupled at a terminal portion of each ~~length~~ segment of ~~each of~~ the ~~multiplicity of~~ additional optical ~~waveguides~~ waveguide associated with the additional pulse detector so as to output a signal upon detection of a pulse traversing the ~~length~~ segment; and

wherein, the first optical waveguide and the ~~multiplicity of~~ additional optical waveguides are disposed in a s~~equential fashion~~ sequence, such that [[a]] each pulse detector ~~of one of the multiplicity~~ operationally controls development of a pulse in a next ~~sequential~~ waveguide ~~of the multiplicity~~ in the sequence.

19. (Currently Amended) The system according to claim 18, further comprising a semiconductor laser disposed to ~~receive an output from a pulse detector of one waveguide of the multiplicity and develop~~ direct an optical pulse into ~~a next sequential~~ an associated one of the additional waveguides ~~of the multiplicity~~ in response to the signal from the pulse detector coupled to the waveguide immediately preceding in the sequence.~~; and~~

~~wherein each waveguide of the sequence has a fundamental length proportional to a length segment of the prior waveguide in the sequence.~~

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20. (Currently Amended) The system according to claim 19, wherein an optical pulse travel time along ~~the fundamental length of~~ one waveguide of the sequence differs from an optical pulse travel time along ~~the fundamental length of~~ an adjacent waveguide in the sequence by one order of magnitude.

21. (New) The system according to claim 19, wherein each of the additional waveguides has a length that is equal to a length of one of the segments of the waveguide that is just prior in the sequence.

22. (New) The system according to claim 18, wherein for each of the waveguides, the segments of the waveguide have equal length.

23. (New) The system of claim 17, further comprising:

a first delay waveguide coupled to provide a first optical path for a pulse of the train to the first optical waveguide;

a second delay waveguide coupled to provide a second optical path for a pulse of the train to the first optical waveguide, wherein a time required for a pulse to traverse the second optical path differs from a time required for a pulse to traverse the first optical path; and

an optical switching system coupled to direct pulses from the semiconductor laser through the first delay waveguide or the second delay waveguide depending on timing of the pulses relative to prior pulses returned from the first optical waveguide.

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